

de la région montagneuse, mais l'observateur ne s'en trouve que plus rapproché de la limite des neiges éternelles."

The French is a correct translation of the German.

The pith of this volume might have been summed up in a single chapter without losing any important contribution to science, and the space so saved might have been devoted to a much-needed bibliography of the subject. The author would not then have completely overlooked the work of the French explorers in Yün-nan. The artistic excellence of the numerous maps by which the volume is illustrated deserves unqualified praise.

### FLOWERS AND WHAT THEY TEACH.

*Types of Floral Mechanism.* A Selection of Diagrams and Descriptions of Common Flowers. Arranged as an Introduction to the Study of Angiosperms. By Dr. A. H. Church, Part i., Types i.-xii. (January to April). Pp. vii+211; with 52 full-page plates (39 coloured) of floral structure, and 79 text-figures. (Oxford: Clarendon Press, 1908.) Price 21s. net.

THE title conveys a very imperfect idea of the nature of this work, which stands apart from all others that have been issued as introductions to the study of botany. The method of teaching botany by a careful investigation of selected types is, indeed, well known and much employed; but it has never been carried out, in English works at least, with any approach to the thoroughness of study of the types in themselves and in their relations to their environment and to their allies that we find here.

The author in a preface informs us that the admirable illustrations were originally prepared for class purposes, limited to a hundred types, of which twelve "Early Spring Types" are included in the present volume, and the arrangement and general scheme are designed to represent the working method applicable to the subject.

"No methods are indicated, nor have any been employed in making preparations which are beyond the reach of the 'elementary student'; and at the same time a general 'elementary' acquaintance with the subject on the part of the reader has been assumed. Since it is necessary to draw the line somewhere . . . and the present work is admittedly of only a general and elementary character, histological details are omitted."

The twelve types treated of are, successively, *Helleborus niger*, *Galanthus nivalis*, *Jasminum nudiflorum*, *Crocus vernus*, *Richardia africana*, *Daphne Mezereum*, *Viola odorata*, *Narcissus Pseudo-narcissus*, *Erica carnea*, *Ribes sanguineum*, *Cydonia japonica*, and *Vinca major*.

In the study of such a series, it is evident that there can be no close connection traced by an "elementary student" between so different types. Thus each becomes the subject of a separate monograph. That on *Viola odorata* may be taken as an example. A brief general notice of its appearance, habitats, tendency to vary, and production of cleistogamic flowers is accompanied by footnotes with references

to descriptions and figures by Dioscorides, Brunfels, Gerarde, and other early botanists, and to its names and cultivation in England. Then follow a detailed description of the inflorescence and flower, and a brief notice of the effects of cultivation on the flower. The floral diagram and phyllotaxis are fully discussed and illustrated, as are also the development of the floral members and the "special mechanism" of the flower for securing the reproduction of the species, including the relations with various bees. The cleistogamic flowers and the possible origin of this type of flower are then treated of.

The various floral "monstrosities" are enumerated, and are "referred to failures in the adjustment of certain features of the floral construction or mechanism." The development and structure of the capsules, their mode of opening, and the structure of the seeds conclude the discussion under *V. odorata*. Then follows a "Comparison of Allied Forms," under which six and a half pages are devoted to *Viola tricolor*, chiefly var. *arvensis*, and five pages to *V. altaica*, or "the garden pansy." For each of these a detailed comparison of the structure and mechanism of the several parts brings into view their resemblances and differences, and their relations with their environment. Although reference is made to the "very variable" *V. tricolor*, there is little stress laid on the extent of the tendency to vary, and the opinion is expressed, even with regard to the relations between *V. tricolor*, *V. lutea*, and allied alpine forms, that "no sharp line of demarcation either exists or need be drawn between 'specific forms' which only exist as useful conventions." While there is a risk of attaching too high a value to the many forms that have been distinguished and named by critical botanists in the genus *Viola*, as in a good many other genera, it may be questioned whether the author might not have usefully directed the attention of students to the nature and degrees of constancy of the forms so freely met with in the Linnean *V. tricolor*.

The study of the types selected is employed by Dr. Church as a basis for certain "Theoretical Conclusions" with regard to the origin and development of the genus *Viola*. The hypothesis is expressed that *V. odorata* is a "highly specialised representative of a shrubby, or even arboreal, plant-phyllum," with "panicles of regular flowers, which had already passed from an asymmetrical vegetative type of construction to a symmetrical pentamerous condition." From this a later evolution led to structural eccentricity of two phases, and to adaptations of the floral mechanism for visits of certain insects. These conclusions find support from a study of the genera associated in the family Violaceæ, *Viola* standing out "as the crowning genus of the entire group; the type, that is to say, in which the various modifications of the original construction are present in the greatest number, and combined to make a most efficient form of floral mechanism." The relations of the forms included under the family to types in other families are discussed, and the steps are summarised that led to the definition of the Violaceæ as a family.

The other eleven types are treated with almost similar fulness, and numerous interesting problems are brought into notice. The arrangements of the floral members (phyllotaxis) in each type receive especial attention, as might be expected from an adept in this subject.

Dr. Church has produced a valuable contribution to botanical literature, excellent alike in the text and in the illustrations, and the execution is worthy of the Clarendon Press. If the remaining eighty-eight types are worked out in the same manner as their forerunners, the whole will form one of the most valuable introductions to the study of angiosperms in any language, but there is reason to doubt whether its necessary size and cost, and the thoroughness of the treatment, may not put it out of reach of most "elementary" students of botany. Its value will be more appreciated by teachers and by advanced students; few botanists can fail to benefit from its pages, and no botanical school can afford to neglect so valuable and suggestive a storehouse of information. There is the more reason to regret that it is on the heavy, highly glazed paper so trying to many eyes and of very doubtful durability.

#### COTTON WEAVING.

*The Cotton Weaver's Handbook.* By H. B. Heylin. Pp. x+326. (London: Charles Griffin and Co., Ltd., 1908.) Price 6s. net.

**D**URING the last twenty-five years many excellent books dealing with textile subjects have been published in Germany, America, and England, but in none of them has cotton weaving been treated as Mr. Heylin treats it. His book contains 462 pages, of which 112 are blank paper, 12 sheets are blank design paper, and 326 pages are of printed matter, the latter being divided as follows:—8 pages are allotted to the index, 30 to a reprint of cotton-weaving examination questions set by the City and Guilds of London Institute, and 36 pages to pictures of textile machinery. On the remaining 252 pages there are upwards of 350 figures, but with the exception of those relating to designs, drafts, and lifting plans, the illustrations are poor. Most of them consist of pictures of machinery and appliances which are of small value to the student, and when, as in this case, they are mainly without reference letters, and inadequately described, they do little more than add to the size of the book. The following may be taken as examples of the majority of these illustrations. Fig. 350 is a picture of a smallware loom, and the descriptive matter consists of "There is a separate shuttle for each tape woven." Fig. 357 has letters added to special mechanism, but these are not referred to. Figs. 273, 274, and 275 are perspective, edge, and plan views of ladder tape, and the only description given is that "ladder tape used for Venetian blinds is a good example of what may be done by the four-ply system of weaving."

In the text there is ample evidence of haste. Statements are repeated again and again, as on pp. 30, 32, and 34, where we are told that the scope for

producing a variety of weave effects is in proportion to the number of threads in the repeat of a design. Again, on pp. 16, 18, and 33, similar repetitions are found concerning broken drafts. That mistakes are very numerous will be seen from the following, which are selected, almost at random, from a long list. On p. 84 it is stated that the ordinary picking motion is "put out of action whilst the wire is inserted to form the warp pile." In these looms the shuttle and the wire are passed through the warp together. The twist tester figured on p. 190 is said to "take out the twist at both ends of the thread simultaneously," whereas it can only untwist from one end. On p. 124, Fig. 294 should read Fig. 296. On the last line of p. 170,  $\frac{1}{120}$  should read  $\frac{4}{120}$ , and on p. 225 "the slacker will be the top speed" should read "the slacker will be the top shed." On p. 214 the calculation for determining the point of connection between the back heald cords and the tappet treadle is wrong, and resolves itself into a calculation to determine the required lift of a tappet for operating the back heald shaft. On p. 221 a swing pinion is said to be compounded with a wheel *D*, and also to gear with the wheel *D*. Three calculations are given on p. 245; one is without answer, and both the others lack some of the cancelled figures.

The chapter on weaves is the best in the book, but since this branch of the subject has been more exhaustively treated by German, American, and British writers than any other, it would perhaps be unreasonable to expect Mr. Heylin to say much that is new concerning them. With regard to the heading of this chapter, it is stated on p. 6 that the term "weave is sometimes miscalled design"; nevertheless, the latter term is used throughout the book. The chapters on the power loom and its accessories, and on preparing yarn for the loom, are quite inadequate. Frequent reference is made for details to the frontispiece, which is an unlettered picture of a power loom, and, therefore, affords no means of identifying the parts. To a reader who is familiar with the loom such descriptions as are given are useless, and to others they will be unintelligible. The "Costing of Cloth" precedes the "Systems of Naming Yarns," and prices are given in shillings, pence and farthings, instead of in pence and decimals of pence; also, where yarns are weighed, pennyweights and grains are used instead of grains only. Several pages are occupied with rules and examples for determining the counts of folded yarns, but in no case is the basis of a rule given; further, the problems do not amount to more than the addition, or the subtraction, of fractions, as,  $\frac{2}{10} + \frac{3}{10} + \frac{1}{10} = \frac{1}{10}$ , and  $\frac{1}{2} - \frac{2}{10} = \frac{3}{10}$ . An undated market report with official quotations for cotton and yarn occupies five pages.

By a thorough revision, and by filling in the blank pages and deleting the examination questions, the subjects named in the contents might be adequately dealt with, but in its present form this book contains so little that is new, and so much that is inexact or untrue, that it is difficult to say for whom it is suited.